

WHAT IS CLAIMED IS:

1. A method for data repair in a system capable of point-to-multipoint communications, the method comprising:

transmitting data from a sender to a plurality of receivers via a point-to-multipoint session;

determining if any expected data was not received;

if some expected data was not received, sending a data repair request to the sender requesting that the expected but not received data be resent; and

retransmitting from the sender the requested data via the point-to-multipoint session.

2. The method of claim ¹0 further comprising:

after the sender retransmits the requested data, if some data was still not received, scheduling point-to-point repair sessions for specific receivers that expected data that was not received;

sending data still not received to the specific receivers via point-to-point sessions according to the point-to-point repair session schedule.

3. The method of claim 2, wherein scheduling point-to-point repair sessions further comprises specifying a randomization mechanism to randomize point-to-point data repair over a certain time period after the sender has retransmitted the not received data.

4. The method of claim 2, wherein scheduling point-to-point repair sessions further comprises:

If point-to-multipoint repair is possible for a receiver, then

uniformly randomizing data repair requests over a time period X starting from the end of the initial transmitting of data from the sender to the receivers via the point-to-multipoint session;

else

waiting until a certain time Y after the initial transmitting of data from the sender to the receivers via the point-to-multipoint session and then randomizing the data repair requests over a time period Z.

5. The method of claim 2, wherein scheduling point-to-point repair sessions comprises sending a point-to-point repair token from the sender to the plurality of receivers to announce when point-to-point repair will begin.

6. The method of claim 3, wherein the randomization mechanism is configured to take into account the number of receivers included in the plurality of receivers.

7. The method of claim 6, further comprising:
determining the number of receivers in the plurality of receiver; and
computing the randomization values for the randomization mechanism based on the determined number of receivers.

8. The method of claim 7, wherein computing the randomization values further comprises looking up the randomization values up in a look-up table based on the determined number of receivers.

9. A point-to-multipoint communication system capable of data repair, the system comprising:

a sender device capable of point-to-multipoint communications;
a plurality of receivers capable of receiving data from the sender device;

wherein the sender device is configured to transmit data to the plurality of receivers via a point-to-multipoint session;

the plurality of receivers are configured to receive data transmitted by the sender device, determine if any expected data was not received, and, if so, send a data repair request back to the sender device requesting that the expected but not received data be resent; and

the sender device is configured to receive data repair requests from the plurality of receivers and to retransmit the requested data via the point-to-multipoint session.

10. The system of claim 9 wherein the sender device is further configured to schedule point-to-point data repair sessions with the plurality of receivers after retransmission of the requested data and the sender is configured to send expected but not received data to the plurality of receivers via point-to-point sessions.

11. The system of claim 10 wherein the sender device is further configured to specify a randomization mechanism to delay point-to-point data repair.

12. The system of claim 11 wherein the sender can determine the number of receivers on the point-to-multipoint session and can compute a randomization mechanism that is based on the determined number of receivers.

13. The system of claim 10 wherein the sender is configured to send a point-to-point repair token to the plurality of receivers to announce when point-to-point repair will begin.

14. The system of claim 10 further comprising a look-up table for determining the point-to-point repair schedule.

15. A computer code product comprising:
computer code configured to:

transmit data from a sender to a plurality of receivers via a point-to-multipoint session;

determine if expected data was not received at any of the plurality of receivers;

make a data repair request if any data was not received at any of the plurality of receivers; and

retransmit the expected but not received data to the plurality of receivers via the point-to-multipoint session.

16. The computer code product of claim 15, wherein the computer code is further configured to schedule point-to-point data repair sessions after retransmission of the expected but not received data.

17. The computer code product of claim 15 wherein the computer code is further configured to determine the number of receivers on the point-to-multipoint session and schedule the point-to-point data repair sessions based on the determined number of receivers.

18. A sender device for use in a point-to-multipoint communication system, the sender device comprising:

means for transmitting data to a plurality of receivers via a point-to-multipoint session;

means for receiving data repair requests from the plurality of receivers requesting expected by not received data;

means for retransmitting the expected but not yet received data via a point-to-multipoint session.

19. The sender device of claim 18 further comprising means for scheduling point-to-point data repair sessions with the plurality of receivers after retransmitting the expected but not yet received data.

20. The sender device of claim 18 wherein the sender device further comprises means for determining the number of receivers using the point-to-multipoint session wherein the sender is configured to schedule the point-to-point data repair sessions based on the determined number of receivers.

21. A method for data repair in a system capable of point-to-multipoint communication, the method comprising:

transmitting data from a sender to a plurality of receivers via a point-to-multipoint session;

determining if any of the plurality of receivers expected data that was not received;

- determining the number of receivers using the point-to-multipoint session;
- computing randomization values for a randomization mechanism based on the determined number of receivers;
- scheduling point-to-point repair sessions with any of the plurality of receivers that expected data that was not received; and
- delaying the point-to-point data repair sessions based on the computed randomization values.

22. A computer code product comprising:

computer code configured to:

- transmit data from a sender to a plurality of receivers via a point-to-multipoint session;
- determine if expected data was not received at any of the plurality of receivers;
- make a data repair request if any data was not received at any of the plurality of receivers;
- determine the number of receivers on the point-to-multipoint session;
- schedule point-to-point data repair sessions for each receiver that did not receive all expected data; and
- delaying the point-to-point data repair session based on the number of determined receivers.

23. A sender device for use in a point-to-multipoint communication system, the sender device comprising:

- means for transmitting data to a plurality of receivers via a point-to-multipoint session;
- means for receiving data repair requests from the plurality of receivers requesting expected but not received data;
- means for determining the number of receivers using the point-to-multipoint session;

wherein the sender device is configured to schedule point-to-point data repair sessions with receivers that did not receive all expected data; and
delaying the point-to-point data repair session based on the determined number of receivers.

24. A point-to-multipoint communication system capable of data repair, the system comprising:

a sender device capable of point-to-multipoint communication;
a plurality of receivers capable of receiving data from the sender device;

wherein the sender is configured to transmit data to the plurality of receivers via a point-to-multipoint session;

the plurality of receivers being configured to receive data transmitted by the sender device, determine if any expected data was not received, and if so, send a data repair request back to the sender device requesting that the expected but not received data be resent;

the sender being configured to determine the number of receivers on the point-to-multipoint session and to determine a randomization mechanism based on the determined number of receivers;

the sender being configured to schedule point-to-point repair sessions with receivers that expected data that was not received, the point-to-point repair sessions being delayed based on the randomization mechanism.